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A PLEA

FOR THE

TRAINING OF THE HAND

BY

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President of Johns Hopkins University
Baltimore

MANUAL TRAINING

AND

THE PUBLIC SCHOOL

BY

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EDITED BY

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NEW YORK.
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A PLEA

FOR THE

TRAINING OF THE HAND.[1]

I am here to make a plea for justice. The defendant in whose behalf I speak comes of an honorable ancestry, is well connected, has acknowledged rights, and has never lost an inheritance of dignity, position and power. The defendant is suffering from neglect; although responsive to good training, able to form good habits, ready to make ample returns for all outlays, the defendant has not received that education which should have been bestowed upon him as a birth-right. I am here to plead for the education of the Hand. In making this plea I do not stand alone, nor is this the only tribunal in which the claimant will be heard. Wherever teachers are in council; wherever philanthropists meet and plan for the benefit of society; wherever political economists begin to study the conditions of social prosperity; wherever the physiologists and psychologists are consulted, manual training is called for, in the Kindergarten on the one hand, and in the University on the other. This cry for hand-craft is not the watchword of a party, but the

[1] I had the honor of delivering an address—the substance of which is given in the following pages—at the opening of the course of lectures given in the Winter of 1886-7, before the Industrial Education Association of New York. The address was not written out at that time, and in now endeavoring to reproduce it, I find myself not quite free to present an essay on the subject of manual training and not quite able to reduce a speech to writing. But my sympathy with the movement which has been initiated by the Association is so strong, and my confidence in the management is so certain, that I am glad to make a contribution to the discussions which are now to be published.

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voice of a popular demand seeking expression in a hundred ways.

Such utterances, indeed, are often vague, and are oftener confused. A sharp distinction should be carefully observed between (a) physical, (b) manual, (c) industrial and (d) technical education; but these terms are so often confounded, that it is important at the outset of this plea, to indicate the different ideas which underlie them.

Physical culture should be understood as the discipline of the entire body by which every organ receives its healthiest and most complete development. Manual training is restricted to the discipline of the arm, the wrist and fingers. Industrial education should refer to preparation for any useful pursuit however humble. And technical education should include the specific discipline required for excellence in a profession, however exalted, or in the practice of an art however difficult. I cannot pause to dwell upon these distinctions, but they ought to be borne in mind. My plea is for the promotion of manual training, the education of the hand.

I wish I were enough of a physiologist to describe to you the characteristics of that member of the human body for which I am speaking. Without professional knowledge I might specify to enumerate the thirty bones that constitute the frame-work of the hand, and it would not be very difficult to specify the beautiful ribbons and bands, fifty of which, we are told, must consent to the simplest action by which the joints are controlled; and I might tell you, possibly, of the veins and arteries through which the streams of nutriment and of waste are constantly flowing; but I know I should fail if I tried to say anything in respect to the wonderful system of nerves which carries messages from the extremities of the body to the centres of consciousness and thought, and which brings to the extremities the orders which are issued with the authority of the will. The hand cannot see, nor hear, nor taste, nor smell, yet no part

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of the body except, perhaps, the tip of the tongue, is as discriminating with respect to touch. The delicate nerves of the fingers can carry, even to the mind of a blind man, most accurate impressions of size, shape, stuff—while the number of offices which they can be trained to perform is beyond all calculation. Though we may almost designate the hand as the organ of touch, it is much more than that. It is the instrument of expression even more than is the tongue.

There is an old treatise on the human hand well worth perusing in these days. Nearly sixty years ago, the Earl of Bridgewater provided for the preparation of several treatises "on the power, wisdom and goodness of God as manifest in His creation," and with a wise sagacity "the construction of the hand of man" was named among the subjects to be discussed. The preparation of a volume upon this theme was assigned to one of the foremost physicians who has ever lived in England, Sir Charles Bell, whose discoveries in respect to the nervous system have given him rank with Harvey, the discoverer of the circulation of the blood, and with Dalton, the author of the atomic theory. It is worth while to mention, in passing, that this Bridgewater essayist was not distinguished at school or college except by his facility in drawing, a gift inherited from his mother. To this volume by Bell I would refer the reader who wishes to understand the anatomy of the human hand, and to learn how it is distinguished from the homologous members of other animals. The seal has its flipper, the bird its wing, the horse its digital hoof, the monkey its prehensile paw, the gorilla an opposable thumb, but not the most anthropoidal of all the quadrumana has the hand of a man. The readiness with which the thumb may be brought into contact with every finger, is one of the most significant characteristics of humanity.

Let me remind you, in a passing remark, that in modern parlance, the "rule o'thumb" is a phrase for clumsy and

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inaccurate manipulation and measurement. Perhaps it marks that decadence of the hand of which I complain. Among the Romans the name of this member indicated dignity. Pollex was the strong one, and many a life has depended in the gladiatorial combats upon the turning-up or turning-down of this dictatorial digit. In the book of Judges there is a sad tale of the fate which befell Adonibesek, the thumb destroyer. "Three-score-and-ten kings," he said, "having their thumbs and their great-toes cut off, gathered their meat (like dogs) under my table. As I have done (to them) so God requited me."

There are many signs that the training of the hand is henceforward to receive far more attention in educational systems than heretofore. Locke has always been regarded as a practical man, and in his *Thoughts on Education*, almost two centuries ago, he advised that when a boy was dull, "to stir up vigor and activity in him, you must employ him in some constant bodily labor whereby he may get a habit of doing something. . . . . You must find bodily employments for him." But now the best physiologists and teachers carry this notion much farther. Dr. Seguin has shown what remarkable development has come to the intellect, and so to the facial expression, of a feeble minded youth by the simple training of his hands. In a paper which he read before the British Medical Association in 1879, he has told the story of the steps by which an idiotic hand was trained, and has given the photographic likenesses of the patient at four stages of his life. First he is seen as a healthy, round-faced infant, six months old; then with a distorted face and idiotic expression, at eighteen months, after convulsions; next at the age of seven, with the characteristics of idiocy enlarged, particularly and more furnished by the hand; and, fourth, one year later, showing the improvement—which is simply marvellous—brought about by the well directed instruction of an intelligent woman. There could be no more positive proof of

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the effect of manual training upon the brain, and so upon all the activities of the body.[1]

The author concludes his paper by this remark: "If the idiot whose case is represented to you has improved under the care of his good teacher; if hundreds of others improve in the public institutions (under the care of women whose names are never pronounced with sufficient respect), the sovereignty of the brain is at an end, and the new physiological doctrine of decentralization contains in germ a new doctrine and new methods of education." The London *Times*, in a recent review of a book on "Eye-sight, Good and Bad," spoke of the surprising advances which have of late years been made in the scientific treatment of the human frame, and proceeded to comment on the extent to which precise and definite knowledge, on matters of daily interest to every family and to the whole community, has taken the place of vague surmises or rough generalizations.

It will not be long before the same careful study which has been given to the eye, the ear, the mouth, the throat, and other bodily organs will be given to the hand, and then we shall have in our schools and households carefully prepared statements of the principles, methods, purposes and results of manual training. I imagine that the nineteenth century, before it closes its account with civilization, will produce another Charles Bell, who will give us another treatise on the hand, based upon a great deal of accumulated experience in respect to its development, its capacities and its achievements. I do not mean that a new anatomical treatise is required, but a study of the anatomy and histology of the nervous system with reference to the manifold purposes to which manual activity is directed.

[1] This story may be found in the Archives of Medicine, edited by Dr. Seguin, Vol. II., No. 2, Oct., 1879. I am indebted to Dr. E. M. Hartwell, Director of Physical Training in Johns Hopkins University, for calling my attention to this interesting case.

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We may anticipate that such a work will plead for the doctrine that general physical culture is essential to the highest development of any particular member of the body, unless there is in it some abnormal aptitude, deficiency or injury. I mean by this, that in advocating dexterity and hand-craft, there will be a caution against beginning prematurely with the special. I have been told by a professor of mechanics, in one of the foremost technical schools of the country, that his worst pupils are those who come from the manual training schools, where certain uses and processes had been taught to the neglect of general culture, mental and physical. I have heard a distinguished chemist say that the best scholars whom he had taught came from the college where intellectual discipline was insisted upon, and not from among the youth who had spent their early days in learning some special process or art, like that of the apothecary or the dyer. A teacher of personal hygiene, whom I know, is accustomed to warn those who are taking bodily exercise, on a systematic plan, to be sure that all the organs of the body are properly cared for, and to remember that in order to make the fingers facile and strong, the arm, from the shoulder out, must be properly developed, and all the organs of the chest must also be in a vigorous condition. "First the blade, then the ear, and then the full corn in the ear," may be translated into terms of manual training, "first the trunk, then the arm, then the wrist and digits." It is with this idea that Charles Kingsley, the advocate of physical culture, in a lecture on "Nausicaa in London," spoke so forcibly of the excellent service rendered to boys by their sports. It is a recognition of this influence proceeding from our national game of base-ball that makes so many people believe in such contests, who are by no means friendly to the betting which goes with them, or to the "professional" conduct of the sport. Huxley enunciated sound doctrine when he said, "the preparatory education of the handicraftsman ought

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to have nothing of what is ordinarily understood as "technical" about it. The education which precedes that of the work-shop, should be entirely devoted to the strengthening of the body, the elevation of the moral faculties and the cultivation of the intelligence, and especially to the imbuing the mind with a broad and clear view of the laws of the natural world, with the components of which the handicraftsman will have to deal. And the earlier the period of life at which the handicraftsman has to enter into actual practice of his craft, the more important is it that he should devote the precious hours of preliminary education to things of the mind, which have no direct and immediate bearing on his branch of industry, though they lie at the foundation of all realities." John Stuart Mill, a philosopher of a very different discipline from that of Huxley, has uttered the same sentiment in these words: "We need schools where the young should learn to use not only their hands, but their minds for the guidance of their hands; and be made to apprehend with their intellects what constitutes the right way of performing industrial operations, and the wrong." "Meanwhile," he continues, "they would acquire not only manual dexterity, but habits of order and regularity, of the utmost use in after life, and which have more to do with the formation of character than many persons are aware of."

After the general discipline of the body, and indeed while it is in progress, and while ordinary mental training is also in progress, the hand must be put in training. In a few cases, the mental characteristics of a youth are so pronounced that the particular education which he should seek is obvious to his friends and to himself. He is born to be a carver, a modeller, a violinist, a pianist, a surgeon, a marksman. Nothing but the most unfavorable environment can prevent the development of one who is gifted with such extraordinary aptitudes.

Limited by opportunities which would seem very far from

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encouraging to a mind of ordinary mould, the stone-cutter of genius will become a geologist, like Hugh Miller, or a sculptor, like Rinehart; the musician, instead of playing in the village band, will delight with his instrumentation the most cultivated audience of the capital; the skillful draftsman will become a physiologist like Pasteur—and so on. But in all plans of education, it is not the genius that we must think of. He will take care of himself. It is common place persons for whom our ordinary schools are arranged.

In our own country, just at this time, the difficulty is to determine what ought to be done for the average youth, and who ought to do it. In all the highest institutions of learning, laboratories are now established where manipulations are taught and simultaneously the theoretical science. Drawing has been introduced among the required studies of well organized schools of every grade. The simple and efficacious discipline of the kindergarten has also won its place. But a good deal more than this is called for in all the intermediate stages of education. Intelligent scrutiny of the conditions of European industry, a better acquaintance with the laws of the human mind, and a careful observation of the conditions of success in this country have impressed upon many teachers the need of providing manual training for youth, between the primary schools and the schools of science. Something more than drawing is needed, fundamental as drawing is. Here, then, is our difficulty. Hence it is that we must watch so carefully the experiments that are in progress in different cities, for the purpose of ascertaining what is the most effective method to accomplish the end in view. For my own part, I feel quite uncertain as to what should be recommended when I attempt to go beyond the enunciation of general principles.

The needs of a great city are very different from those of a large village, those of a village from those of a rural neighborhood. The industries established in a given locality are also to be considered. Where all the population

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are interested in coal and iron, the manual training required by the youth is very different from that which is required in a place where many delicate processes (for example, the manufacture of jewelry, watches and instruments of precision), is the dominant interest. Decorative art and designs for tissues, wall-papers, carpets and other fabrics, must receive special attention in another region. There are many places where every variety of handicraft is practiced. Moreover, the different potentialities of scholars must be borne in mind, and the fact that many, as they enter their teens, depart forever from the life of the school, while others more favored by fortune will continue their scholastic education far beyond their majority, and others still will supplement by work in evening classes the elementary education which they have received at day-school.

All these points are mentioned, not by way of discouragement, but for the sake of perspicacity. I am inclined to think, however, that among the most enlightened teachers of this country there is a general recognition of the principles which I am about to name. If our schools, through the length and breadth of the land, could be organized in accordance with these principles, the American youth would grow up with better intellectual powers, for the powers of attention, judgment, expression, would be developed; the art of earning a living would be deprived of much of its drudgery, because the youth thus trained would see exactly, handle carefully, and perform with nicety of touch their appointed tasks. Earning a livelihood would be an easier as well as a pleasanter task; and society, in the aggregate, would be benefited by the advancement of individuals in taste, skill and productivity.

These are the the principles to which I have referred:

1. The value of manual training as a method of improving the brain and nervous system, or, in other words, our thinking apparatus, must be acknowledged.

2. The value of manual training as a method of promot-

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ing the arts of accurate and precise expression is likewise to be distinctly recognized.

3. The value of manual training as a method of preparation for subsequent industrial or professional pursuits—or, in other words, the fact that manual training is antecedent to technical education, is generally admitted.

4. The importance of carrying forward manual training simultaneously with all other educational processes, must not be lost sight of, so that the brain shall be taught simultaneously by the eye, through the printed page and through every variety of object lesson; by the ear, through every form of utterance, reading aloud, familiar lectures and conversations, the repetition of poetry, and the learning of music, vocal and instrumental; and by the hand, in measuring, matching, marking and making.

5. Universal instruction should be provided in the use of the pen and pencil, and especially in the last named, for drawing is the simplest, most easily taught, and most generally useful of all the fundamental arts of handicraft.

6. Among boys, both in the city and the country, instruction should be provided in the use of carpenters' tools. Such tools are simply an expression of the capacities of the hand. To learn how to use them with accuracy is not only a valuable intellectual discipline, it has even moral significance in developing the habits of care, fidelity, thoroughness, honesty, and it makes the possessor of the power "handy" in a multitude of the situations and emergencies of life.

7. For girls, the needle is the universal implement, and yet there is no reason why boys should not learn to sew, nor why girls should not learn to use the simple instruments of the carpenter's bench.

8. Beyond these subjects—drawing, carpentry and sewing—there is a boundless field for lessons in metal-working, in iron or brass. Household duties, especially the art of

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cooking, and the decorative arts of ornamentation and needle-work may all be introduced if there are competent teachers; but here, again, the lessons should be of general and fundamental character—not as yet special in the line of industrial pursuits.

9. Subsequent to manual training come the methods of technical or professional training, and these are as various as the occupations of mankind. But as it is obviously impossible to have technical schools for every human vocation, those subjects which are of general significance and importance first deserve recognition. It is only in exceptional places, where some one form of industry (lace-making, for example, or watch-making), is established, that a very special school is to be established.

10. Pecuniary returns are not to be expected from the results of manual training. There must be no expectation that objects are to be made for sale in the market, or that the school is to have its expenses met, in whole or in part, by the work of the pupils. It would be just as reasonable to expect that the compositions of a school-boy, or the drawings of a school-girl, should have a pecuniary value. All such juvenile products are of no value to any one but the owner, and to him only as evidence of efforts put forth with more or less success.

If these principles are to be enunciated in one statement, this is the truth. Manual training is an essential part of a good education, whether that education be restricted to the common school or carried on to the highest discipline of technical schools and universities.

Ladies and gentlemen of this Association: I think it most advantageous that, just at this epoch, when all over the land there are efforts making to introduce manual training, a society has been formed in New York, to collect the experience of this and other lands, to furnish actual examples of classes organized for discipline in handicraft, to build up

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a library, to provide lectures, to print reports and papers, and to diffuse in many ways sound ideas. I am sure that the work of this association, though it begins at home, will not end here. Your proceedings will be watched in every part of the country, and if your methods cannot be exactly imitated, your principles will be generally adopted. You must find out what is best adapted to supply the deficiencies of American common schools, and when the public see what is needed, they will not be slow to demand it. I am not sanguine about the general introduction of manual training in ordinary public schools, as at present administered, for it will be hard to make a break in the routine which has been established, and hard to find teachers qualified in disposition and in skill to give the necessary instruction. But, I believe, that either at private expense or public, supplementary schools can be established, in which teachers can be trained and in which the methods of manual training can be exhibited, and the value demonstrated. This part of your undertaking will be watched and appreciated in every part of the land.

You will also be able to bring before Americans the experience of other countries, and to save us from many efforts which have been proved to be fruitless. Matthew Arnold has warned his countrymen against neglecting to observe the experience of other lands in these words: "The English notion is, that you come to do a thing right by doing it, and not by first learning how to do it right and then doing it. Our rule of thumb has cost us dear already, and is probably destined to cost us dearer still." To save the country from such educational blunders and expenses, this Association will be most helpful. Show us what is the right way of promoting manual training and we will follow your counsels.

New York has taught the country three great educational lessons by the establishment of the Astor Library, the Central Park, and the great Museums of Natural History

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and the Fine Arts. I believe it will teach us a fourth lesson—the right method of promoting physical, manual, industrial and technical education. Not only the work of this Association is watched elsewhere. The School of Mines of Columbia College, the College of the City of New York, the Auchmuty Trade Schools, the Cooper Institute, the Adler Schools, and the Metropolitan Art Schools are all held up to other cities as examples of good foundations. Last, but not least, in its capacity for usefulness and instruction is the Association which I have had the honor to address.

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THE PUBLIC SCHOOLS
AND
MANUAL TRAINING.

Of the many grave problems now before the American people, one of the gravest is that of the education of the masses, a problem which is justly demanding and receiving the attention of thinking men and women who have at heart the stability of the Republic. "Whatever we wish to see in the life of a nation," said Wilhelm von Humboldt, "we must first put into its schools." And at present, and for many years to come, the great masses of our people must be educated in our public schools.

It should be a question for public school teachers and directors to consider whether the present public school system is answering in a satisfactory manner the demands of the age upon it—whether it is doing the best that can be done under the circumstances for the children committed to its care. It is an easy matter to criticise, to indulge in wholesale fault-finding, and to denounce the present order of things in church, state and school. I am not one of those who can see no good, or but little good, in the present public school system. On the contrary, I regard the public schools, with all their defects—for they have defects, as has everything else human—as one of the most important and valuable agencies in securing the welfare of our people, and for welding into one the heterogeneous elements that are poured into the bosom of America. The public school has always been on the side of law and order. The men who cry in our streets for blood or bread, the

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men who use dynamite in Haymarket Squares, are not graduates of our public schools.

The American public school of to-day is not the public school of one hundred years ago. It has accommodated itself, or at least has tried to accommodate itself, to the increasing wants of the people. It has enlarged its curriculum to satisfy the demands of its patrons. To some, who would confine its teaching to the traditional "three R's," this is a matter of regret; to others it is the evidence of a healthy growth.

To those who take the latter position it is a pertinent question whether the full stature of manhood has been reached, or whether the schools shall continue to grow, and if so, along what line. I am well aware that many warm friends of the schools, especially teachers, look with dismay upon the proposition to introduce additional matter into an already overcrowded curriculum, and they consider it a paradox to say that the work now imposed on the children can be done better *with the addition* of manual training than it is now done without it. But of this hereafter. We may briefly consider the introduction of manual training into public schools under three heads:

I.—ITS LEGALITY.—This question is troubling some of the friends of manual training in the West. It is a qustion very easily disposed of. If manual training is desirable and practicable, and the school law prohibits it, repeal the law and enact a better one. The law is made, or ought to be made, for the people, not the people for the law. If the people of a state or of the nation do not have such laws as they want it is their own fault. I do not know how it is in other parts of the country, but in the West no tax is paid as cheerfully as is the school tax; and no State legislature would dare to refuse the passage of such a school law as the people might demand. And if normal schools, law schools, schools of medicine and of engineering are legally supported by the State, manual training for the masses either is lawful or can be made so.

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II.—Is Manual Training Practicable? It is. It is already an accomplished fact.

III.—Is Manual Training Desirable? The answer to this question involves many particulars, only the principal of which can be discussed at this time. Among other things, it involves the consideration of the question, or questions, what is education, and what is its aim?

Education is not simply the acquisition of knowledge; nor, if it were, are books the only means of education. Education is the acquisition of knowledge and of power to use knowledge. It is the complete, systematic, and harmonious development of every faculty of the child, mental, moral and physical. The history of the different ideals of education which have prevailed is instructive. There was the Greek ideal, the worship of physical beauty, not, I think, as many believe, for the sake of the physical beauty alone, but as the representative of the "fair soul" within,—"the fairest and loveliest of all sights," says Plato, "to him who has the seeing eye." There was the Persian ideal, according to Xenophon, "to ride, to shoot, to speak the truth." There was the ascetic ideal, the exaltation of the soul by the torture of the body. The classical ideal is portrayed in Milton's famous Tractate, which prescribes for the boy more Greek and Latin authors than some of our modern professors have ever heard of. And there is that education described by Professor Huxley, the description of which I wish could be studied by every teacher, school director and law-maker in the country.

We pedagogues are sometimes, if not always, prone to believe that in books alone lies the means of education. We are apt to forget that in the olden time many a man who made his "x mark" made also such a mark on the world that it never has been and never will be erased. If judged by the amount of their school instruction, or by their literary attainments, even such men as Watt and Bolton must be denied the title of educated men. These

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benefactors of their race, these men really and truly intellectually great, whose names shine with ever increasing lustre, must, by this standard, be judged inferior to the university graduates familiar with the niceties of Greek and Latin prosody, who go in thousands to their unknown graves "unhonored and unsung." Even the great masters of literature have not always taken kindly to school tasks. Scott was voted a dunce; Macaulay's aversion to mathematics is well known. It is by no means certain that Homer and Shakspeare would have been crowned with university honors. But this is not a screed against literary training. The advocates of what is sometimes called the new education indulge in no sneers at what, in Yankee dialect, is called "book-larnin'." Books are useful tools in the hands of the child; but they should not be his only tools. Knowledge at first hand is the best knowledge. Too often does the text-book stand between the child and the thing itself. The senseless method of teaching physics and chemistry by memorized recitations from books has largely given place to laboratory practice. The memorized descriptions of the powers of steam and the parts of the steam engine are yielding to the making and the running of the steam-engine by the pupil himself. Books, as the preservers and propagators of knowledge, are invaluable. Science and art cannot be too highly prized and praised. But, in the words of John Fiske, "in a very deep sense all human science is but the increment of the power of the eye, and all human art is the increment of the power of the hand." To the skilled hand science is largely indebted for the means of its advancement. What a wonderful impulse to the spread of knowledge has been given by the telescope, the microscope, and the various apparatus now at the command of the scientific man. The scientific mind and the skillful hand have been too seldom found in the possession of the same man. Why should they be separated? It is the prerogative of the new education to say, "What God has joined together let not man put asunder."

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It should never be forgotten that education is not an end, but only a means to an end. Intellectual vigor is certainly desirable, as is bodily strength ; but if not used they are of no more utility than the hoards of a miser, or the powerful locomotive standing cold and lifeless on the track. The end of all education is preparation for life. By this I do not mean simply the learning of a trade or the study of a profession. I fail to see, however, anything degrading in that mastery of tools which is called a trade. It was the philosophic Emerson who said, "A man should have a farm or a mechanical craft for his culture." Many examples will at once occur to you of distinguished men who were skilled artisans as well as great scholars and philosophers. Spinoza has been called, by good authority, "the most powerful intellectual worker that Europe has produced during the last two centuries ;" and Spinoza, refusing pensions and legacies, preferred to maintain himself by the skilled labor of his hands. Paul, like all well-educated Jews of his day, was master of a trade ; and He whom Paul called Lord and Master, was a carpenter. If every professional man were also a mechanic he would be a stronger man professionally than he is now. One of the elements of strength in the greatest of all dramatic poets is his apparent acquaintance with the details of many callings. Lawyers, doctors, merchants, visiting the Chicago Manual Training School, frequently express their regret, from a business point of view, that their education had not included such a training as they see our boys obtaining. But, as I have said, the end of education is preparation for life, and the best preparation for this life is in the line of preparation for the life that is to come. A discussion of the relation of the public schools to religion does not belong here. Nor do I claim that manual training is to be the panacea for human ills. But I imagine that the saints above were, in all probability, when on earth, law-abiding and industrious citizens, and not the inmates of jails and reformatories.

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The advantages of manual training are briefly these:

I.—It develops the physical health. No one is disposed to deny this. It is the voluntary and oft-repeated testimony of the parents of our pupils that their sons' health has improved and continues to improve steadily, from the date of their admission to the school. Several mothers have told me that their boys never before had been able to complete a school year. They had always been taken from school on account of broken health. There is a foot-ball league composed of pupils from the three Chicago city high schools, several suburban high schools, and the manual training school. The champions of the league are the boys of the manual training school, whose eyes have been trained in the machine shop, and whose muscles have been hardened at the forge.

II.—What I have said concerning increased bodily vigor ought to testify to increased mental vigor, provided the body has not been developed at the expense of the mind. I need not quote to you medical authorities to prove that the old adage of a healthy mind in a healthy body is scientifically correct. Both European and American schools must plead guilty to the charge of overpressure. Medical men testify to the injurious effects of a long-continued taxing of the brain, especially when combined with inactivity of the body. After making proper allowance for the ill health due to late hours, improper food, and other causes over which the teacher has little control, the ill-effects of school life on many children cannot be denied. Those who look upon the culture derived from books as the one great test of a school's excellence should not oppose the introduction of hand-culture. It is a well-known fact that in the half-time schools in England, the pupils who spend half their time in schools and the other half in the factory, keep fully abreast in their studies of the children who spend the usual number of hours in school. The manual training schools all bear the same testimony. In Chicago the

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pupils devote one hour every day to drawing, and two hours every day to shop-work, and accomplish as much academic work as do the pupils of the ordinary high-school.

We are apt to associate in our minds the use of tools with lack of education and refinement. The word mechanic suggests a grimy face and greasy hands. If the new education proposed to substitute the use of tools for the use of books, it would be a step backward, and its success would be a calamity. The lack of refinement of the average mechanic, when compared to that of the average professional man, is not due to his knowledge of tools, but to the absence of those surroundings which develop refinement. The mechanic, who has no thought above his daily task, may be called an illustration of arrested development. Not only is he deprived of books and the association of refined men, but, by constant practice, his work has become automatic, and makes no draft upon his brain. We are sometimes criticised for attempting too much in our manual training schools. "Why not teach one trade well, and not give the boys a smattering of several?" is asked. "Have we not enough mechanics who have not half learned their business?" To which we reply that we have always distinctly stated that we do not attempt to teach trades. We seek intellectual training through the eye and hand. The hand is but the agent of the brain, and the training of the hand is *ipso facto* a training of the brain. We take special care to avoid the automatism of the skilled mechanic, and by presenting to the boy a carefully graded series of exercises, seek to keep his mental faculties constantly on the alert.

But there is another view to be taken of this subject. If the aim of education is preparation for life, it should have in view the development of the power of self-support. I know the outcry raised against this view of education, but I cannot resist the conviction that it is a factor of prime importance. Admitting everything that is said regarding the

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high aims of education, the development of the immortal spirit within, and all of that, the fact remains that every man ought to be able to support himself and his family by honest labor, and that the great majority of men do support themselves and their families. The number of men who live on the accumulation of their fathers is comparatively small. The number who, as paupers and criminals, subsist on the honest earnings of others, is much larger than it would be if the youth of the country had been taught to earn an honest living by the labor of their hands. The Talmud well declares, "When a man teaches his son no trade it is as if he taught him highway robbery." There are more than ten millions of children in the public schools of the United States, of whom certainly two and a half millions must support themselves by the labor of their hands. The state is spending many millions of dollars every year to develop the brain power of these children. And the state does well. But it would do better if it should also spend something to develop the immense amount of hand-power which is almost wholly neglected. The average age at which children leave school is thirteen years. It has long been a mystery to many good people why they refuse to stay longer, refuse to complete the grammar school course, and to enjoy the "sweetness and light" of the high school. The reasons seem to me to be plain. Disinclination to submit to the healthy restraint of the school takes some out. Lack of ability to keep up with their classmates drives out others. The poverty of the home, and the absolute need of the small earnings of the child, is the cause of thousands leaving school. But I believe that by far the greater number leave because the schools do not teach them what they want to know, because their parents and they themselves cannot see that further continuance in school will help them when they come to earn their own living. And I firmly believe that the introduction of handicraft into our schools would result in raising the age at which children leave school.

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In his report on technical education in the United States, Mr. Wm. Mather, of Manchester, England, remarks :

"The effect of the public schools, colleges, and universities, supported by taxation of the people, is more marked in general education in literary branches, and in this direction their influence is not altogether a benefit. Too large a class of young people in America of both sexes are seeking pursuits not requiring manual labor. Their education, as given at present in the high schools and colleges—he might have included the lower schools—tends rather to unfit them for the active industries of life, in a country where the vast resources of nature are waiting for willing and trained hands to utilize them. The native-born American hates drudgery, and all the mechanical arts, when pursued without some knowledge of science to employ and interest the mind, are more or less drudgery. The American boy, with his inborn ambition and natural ingenuity, would cease to regard manual labor as drudgery if his hand and mind together were industrially trained through the school period. He would then be led into industrial employments by choice, as the readiest means to climb to a higher position in life. All Americans have more or less of the mechanical faculty. It is the characteristic of the race. The problems involved in settling the country have been more mechanical than political. In early times almost all men and all women were engaged in manual work and in exercising their wits to avail themselves of the forces of nature. To this natural bias the public school education gave the means for higher development. The demand for mechanical contrivances to save labor held out the promise of great reward ; and the protection of cheap patents gave confidence and security. Thus the working men of America have been educated and brought up under conditions different from those prevailing in Europe."

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